WHAT IS CLAIMED IS:

1. Process for preparing homopolymers, copolymers and block copolymers of one or more 1-olefins, comprising adding one or more monomer in succession in the presence of transition metal compounds having a fluorenyl ligand, at least one further ligand and at least one donor-acceptor interaction between the ligands or reaction products of these transition metal compounds and a cocatalyst(s), wherein the is carried out in the temperature range from -40° to +15°C and

2. The process according to Claim 1, wherein the at least one further ligand is a cyclopentadienyl ligand or a substituted cyclopentadienyl ligand.

3. The process according to Claim 1, wherein the block copolymer(s) are based on one or more polar or nonpolar monomers.

4. The process according to Claim 1, wherein the homopolymer(s) and copolymer(s) has a polydispersity M_w/M_n in the range from 1 to 2.

5. A process for preparing 2-block copoylmers comprising the process of Claim 1.

6. A process for preparing 3-block copoylmers comprising the process of Claim 1.

7. The process according to Claim 1 further comprising adding a termination reagent(3), wherein the homopolymer(s), copolymer(s) or block copolymer(s) is end-functionalized.

8. A process for preparing polymers having bimodal molar mass distributions according to Claim 1, further comprising the presence of a second transition metal compound with or without a donor-acceptor interaction, wherein the difference between the two molar masses is able to be varied by the length of the reaction.

9. An elasticized, high-impact thermoplastic comprising a block copolymer prepared according to Claim 1.

10. A rubber having high green strength comprising a block copolymer prepared according to Claim 1.

11. A thermoplastic elastomers (TPEs) having a melting point greater than +60°C and a glass transition temperature of less than +10°C comprising a block copolymer prepared according to Claim 1.

12. A thermoplastic elastomers (TPEs) having a melting point greater than +60°C and a glass transition temperature of less than +10°C comprising a 3-block copolymer prepared according to Claim 1.

13. A homopolymer prepared according to the process according to Claim 1.

14. A copolymer prepared according to the process according to Claim 1.

15. A block copolymer prepared according to the process according to Claim 1.

16. A polymer blend comprising the homopolymer, copolymer or block copolymer prepared according to Claim 1.